

§ 1505.7

place. If a metal surface is involved, brazing or soldering the thermocouple to the metal may be necessary. The surface temperatures of a toy shall be measured with the toy operating in any unattended condition (e.g., with and without opening and closing doors or covers) for a sufficient period of time to allow temperatures to become constant, or, in the case of a toy with a thermostatically controlled heating element, for a sufficient period of time to determine the maximum surface temperature attained. A temperature shall be considered to be constant when three successive readings taken at 15-minute intervals indicate no change.

(iii) *Heating devices.* Toy ovens, casting toys, popcorn and candy makers, and other toys requiring the insertion of any materials or substances shall be additionally tested by feeding crumpled strips of newspaper and tissue paper into or onto the toy in place of the intended materials or substances. The test strips shall be conditioned for at least 48 hours in air at a temperature of $25^{\circ} \pm 4^{\circ} \text{C}$. ($77^{\circ} \pm 7^{\circ} \text{F}$.) and a relative humidity of 50 percent ± 5 percent. The test strips shall be 2 inches wide by 8 inches long before crumpling. The crumpled paper shall occupy not more than 25 percent of the accessible volume. The performance of the toy shall be considered unacceptable if flaming occurs within a 60-minute period following the attainment of normal operating temperatures. If a light bulb is used for heating purposes, the test shall be conducted using the largest wattage bulb that can be easily inserted into the socket.

(h) *Strain-relief test.* (1) The strain-relief means provided on the flexible power cord of a toy shall be capable of withstanding a direct pull of 35 pounds applied to the cord for 2 minutes without displacement of the strain-relief unit or a deformation of the anchoring surface that would produce a stress which would result in a potentially hazardous condition. A 35-pound weight shall be attached to the cord and supported by the toy in a manner that the strain-relief means is stressed from any angle that the construction of the toy permits. The test shall be conducted with the electrical connection within the toy disconnected.

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(2) The initial 2-minute test shall be conducted with the force vector parallel to the longitudinal axis of the cord and perpendicular to the anchoring surface of the strain-relief unit. Each test at other angles of stress shall be conducted for periods of 1 minute. The strain-relief means is not acceptable if, at the point of disconnection of the cord, there is any movement of the cord to indicate that stress would have resulted on the connections.

(3) Except for toys weighing more than 10 pounds, the strain-relief unit and its support base shall be designed and constructed in such a manner that no indication of stress would result which would produce a hazard when the cord is held firmly in place 3 feet from the strain-relief unit and the toy is dropped the 3 feet at any angle.

[38 FR 27032, Sept. 27, 1973; 38 FR 30105, Nov. 1, 1973, as amended at 43 FR 26428 June 20, 1978; 46 FR 63251, Dec. 31, 1981; 51 FR 34199, Sept. 26, 1986]

§ 1505.7 Maximum acceptable surface temperatures.

The maximum acceptable surface temperatures for electrically operated toys shall be as follows:

Surface type (as described—in § 1505.6 (g)(2))	Thermal inertia type ¹	Temperatures	
		°C.	°F.
A	1	50	122
A	2	55	131
A	3	60	140
B	1	55	131
B	2	65	149
B	3	75	167
C (unmarked)	1	65	149
C (unmarked)	2	75	167
C (unmarked)	3	85	185
C (unmarked)	4	95	203
C marked	1	70	158
C marked	2	90	194
C marked	3	110	230
C marked	4	130	266
D (unmarked)	1	55	131
D (unmarked)	2	70	158
D (unmarked)	3	80	176
D (unmarked)	4	90	194
D marked	1	60	140
D marked	2	75	167
D marked	3	100	212
D marked	4	125	257
E	(²)	(³)	(³)

¹ Thermal inertia types are defined in terms of lambda as follows:

Type 1: Greater than 0.0045 (e.g., most metals).
Type 2: More than 0.0005 but not more than 0.0045 (e.g., glass).
Type 3: More than 0.0001 but not more than 0.0005 (e.g., most plastics).
Type 4: 0.0001 or less (e.g., future polymeric materials).

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The thermal inertia of a material can be obtained by multiplying the thermal conductivity (cal./cm./sec./degrees C.) by the density (gm./cm.³) by the specific heat (cal./gm./degrees C.).

² All types.

³ No limit.

§ 1505.8 Maximum acceptable material temperatures.

The maximum acceptable material temperatures for electrically operated toys shall be as follows (Classes 105, 130, A, and B are from "Motors and Generators," Standard MG-1-1967¹ published by the National Electrical Manufacturers Association):

Material	Degrees C.	Degrees F.
Capacitors	(¹)	(¹)
Class 105 insulation on windings or relays, solenoids, etc.:		
Thermocouple method ²	90	194
Resistance method	110	230
Class 130 insulation system	110	230
Insulation:		
Varnished-cloth insulation	85	185
Fiber used as electrical insulation	90	194

	Class A	Class B	Class A	Class B
Insulation on coil windings of a.c. motors (not including universal motors) and on vibrator coils:				
In open motors and on vibrator coils—thermocouple or resistance method ²	100	120	212	248
In totally enclosed motors—thermocouple or resistance method ²	105	125	221	257
Insulation on coil windings of d.c. motors and of universal motors:				
In open motors:				
Thermocouple method ²	90	110	194	230
Resistance method	100	120	212	248
In totally enclosed motors:				
Thermocouple method ²	95	115	203	239
Resistance method	105	125	221	257
Phenolic composition ³		150	302	
Rubber- or thermoplastic-insulated wires and cords ³		60	140	
Sealing compound		(⁴)	(⁵)	
Supporting surface while the toy is operating normally		90	194	
Wood and other similar combustible material		90	194	

¹ If the capacitor has no marked temperature limit, the maximum acceptable temperature will be assumed to be 65 °C. (149 °F.) for an electrolytic type and 90 °C. (194 °F.) for other than an electrolytic type.

² The temperature indicated refers to the hottest spot on the outside surface of the coil measured by the thermocouple method.

³ The limitations on rubber- and thermoplastic-insulated wires and cords and on phenolic composition do not apply if the insulation or the phenolic has been investigated and found to have special heat-resistant properties, or if the insulation meets the thermal requirements.

⁴ 40 less than melting point.

⁵ 104 less than melting point.

Subpart B—Policies and Interpretations

§ 1505.50 Stalled motor testing.

(a) § 1505.6(e)(4)(ii) requires that a motor-operated toy be tested with the motor stalled if the construction of the toy is such that any person can touch moving parts associated with the motor from outside the toy. The performance of the toy shall be considered unacceptable if, during the test, temperatures higher than those specified

in § 1505.8 are attained or if temperatures higher than those specified for Type C surfaces in § 1505.7 are attained on any accessible surface of the motor.

(b) To determine if a moving part associated with the motor can be touched from outside the toy, the Commission staff will use a ¼-inch diameter rod, as referenced in § 1505.4(h)(1). If the rod, when inserted into openings in the toy, can touch any moving part associated with the motor, the toy will be tested with the motor stalled.

¹ Copies may be obtained from: National Electrical Manufacturers Association, 155 East 44th Street, New York, NY 10017.